

(10) **Patent No.:** US 9,331,802 B2
(45) **Date of Patent:** May 3, 2016

- (58) **Field of Classification Search**
USPC 370/270, 335, 486; 455/121, 142;
709/217, 223, 229, 201; 725/39, 40,
725/44, 48, 113, 45
See application file for complete search history.

- (56)
- References Cited**

- | | | | | |
|-----------|------|--------|----------------------|---------|
| 6,628,625 | B1 * | 9/2003 | Birdwell et al. | 370/270 |
| 6,675,385 | B1 * | 1/2004 | Wang | 725/39 |

- FOREIGN PATENT DOCUMENTS

- | | | | |
|----|---------|-----|--------|
| EP | 1383325 | A2 | 1/2004 |
| GB | 2396228 | A * | 6/2004 |

- (Continued)

OTHER PUBLICATIONS

Publisher: ETSI Title: IP Datacast over DVB-H: Electronic Service
Guide Date: Sep. 2005.*

- (Continued)

- Primary Examiner* — Melvin H Pollack

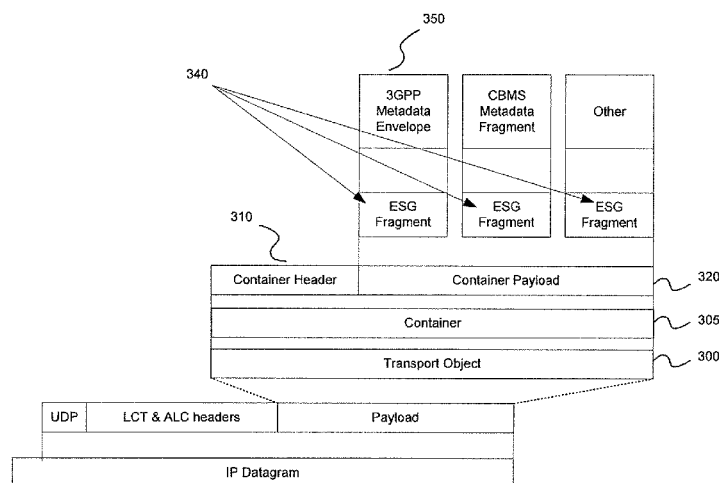
- (74) *Attorney, Agent, or Firm* — Ditthavong & Steiner, P.C.

- (57) **ABSTRACT**

Provided are apparatuses and methods in a digital broadcast transmission system for identifying a desired ESG fragment in a list of ESG fragments. The list of ESG fragments or bootstrap ESG may be created by a designated service provider, operator or other apparatus or system. The bootstrap ESG may contain information on, or refer to, secondary ESG fragments. In addition, the secondary ESG fragments may contain information on, or refer to, other ESG fragments in a hierarchical arrangement. A mobile terminal may identify a desired ESG fragment from the bootstrap ESG by identifying criteria within the bootstrap ESG corresponding to a secondary ESG, for example.

- (52) **U.S. Cl.**
CPC *H04H 60/39* (2013.01); *H04N 21/235*
(2013.01); *H04N 21/2362* (2013.01); *H04N*
21/2665 (2013.01); *H04N 21/41407* (2013.01);
H04N 21/435 (2013.01); *H04N 21/4351*
(2013.01); *H04N 21/4381* (2013.01); *H04N*
21/4622 (2013.01); *H04N 21/64315* (2013.01);
H04N 21/64322 (2013.01); *H04N 21/8543*
(2013.01)

47 Claims, 13 Drawing Sheets



(51) **Int. Cl.**

H04N 21/435 (2011.01)
H04N 21/438 (2011.01)
H04N 21/462 (2011.01)
H04N 21/643 (2011.01)
H04N 21/8543 (2011.01)

2009/0185522 A1 * 7/2009 Periyalwar et al. 370/328
 2009/0222855 A1 * 9/2009 Vare et al. 725/39
 2009/0268648 A1 * 10/2009 Tardy et al. 370/310

FOREIGN PATENT DOCUMENTS

GB 2396444 A * 6/2004
 JP 2001346270 A * 12/2001
 WO WO 9935849 A1 * 7/1999
 WO 2004040473 A2 5/2004
 WO WO 2005/069624 A2 7/2005
 WO 2006065074 A1 6/2006

(56)

References Cited

U.S. PATENT DOCUMENTS

7,395,547 B2 * 7/2008 Hammett et al. 725/34
 2001/0011996 A1 * 8/2001 Terakado et al. 345/156
 2003/0031207 A1 * 2/2003 Upadhyaya 370/474
 2003/0093790 A1 * 5/2003 Logan et al. 725/38
 2003/0145085 A1 * 7/2003 Baldwin et al. 709/225
 2003/0208761 A1 * 11/2003 Wasserman et al. 725/53
 2003/0229898 A1 * 12/2003 Babu et al. 725/87
 2004/0002987 A1 * 1/2004 Clancy et al. 707/101
 2004/0040036 A1 * 2/2004 An 725/39
 2005/0193408 A1 * 9/2005 Sull et al. 725/32
 2006/0019618 A1 * 1/2006 Seppala 455/121
 2006/0117260 A1 * 6/2006 Sloo et al. 715/719
 2006/0126597 A1 * 6/2006 Chae et al. 370/352
 2006/0294205 A1 * 12/2006 Aaltonen et al. 709/219
 2007/0061862 A1 * 3/2007 Berger et al. 725/139
 2008/0065548 A1 * 3/2008 Muijen 705/51
 2008/0200186 A1 * 8/2008 Vare et al. 455/456.2
 2008/0235739 A1 * 9/2008 Coebergh Van Den
 Braak 725/86

OTHER PUBLICATIONS

A Scalable Internet Program Guide Architecture, Liefvooghe et al.,
 Proceedings of the ATNAC 2003, Melbourne, Australia, Dec. 1,
 2003, XP007908466, <http://atnac2003.atcrc.com/ORALS/Liefvooghe.pdf>, pp. 1-5.
 Digital Video Broadcasting (DVB); Transport of MPEG-2 Based
 DVB Services over IP Based Networks, European Broadcasting
 Union, ETSI TS 102 034, V1.1.1, Mar. 2005, pp. 1-91.
 European Office action for corresponding EP patent appln. No.
 06820821.4-2223 dated Aug. 13, 2010, pp. 1-7.
 European search report for corresponding EP patent appln. No.
 06820821.4-2223 dated Jul. 7, 2010, pp. 1-4.
 IP Datacast over DVB-H: Electronic Service Guide, TM 3348 Rev. 1,
 Sep. 2005, XP002393945, pp. 1-95.

* cited by examiner

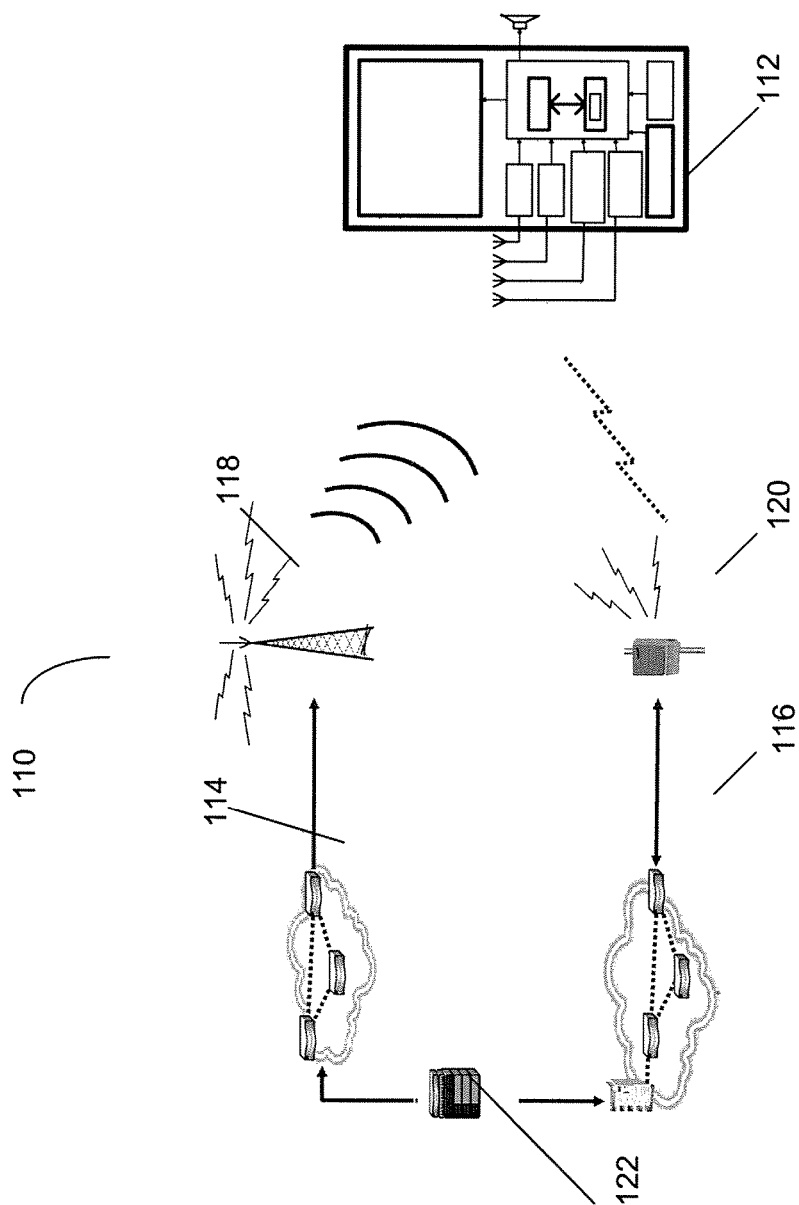


FIG. 1

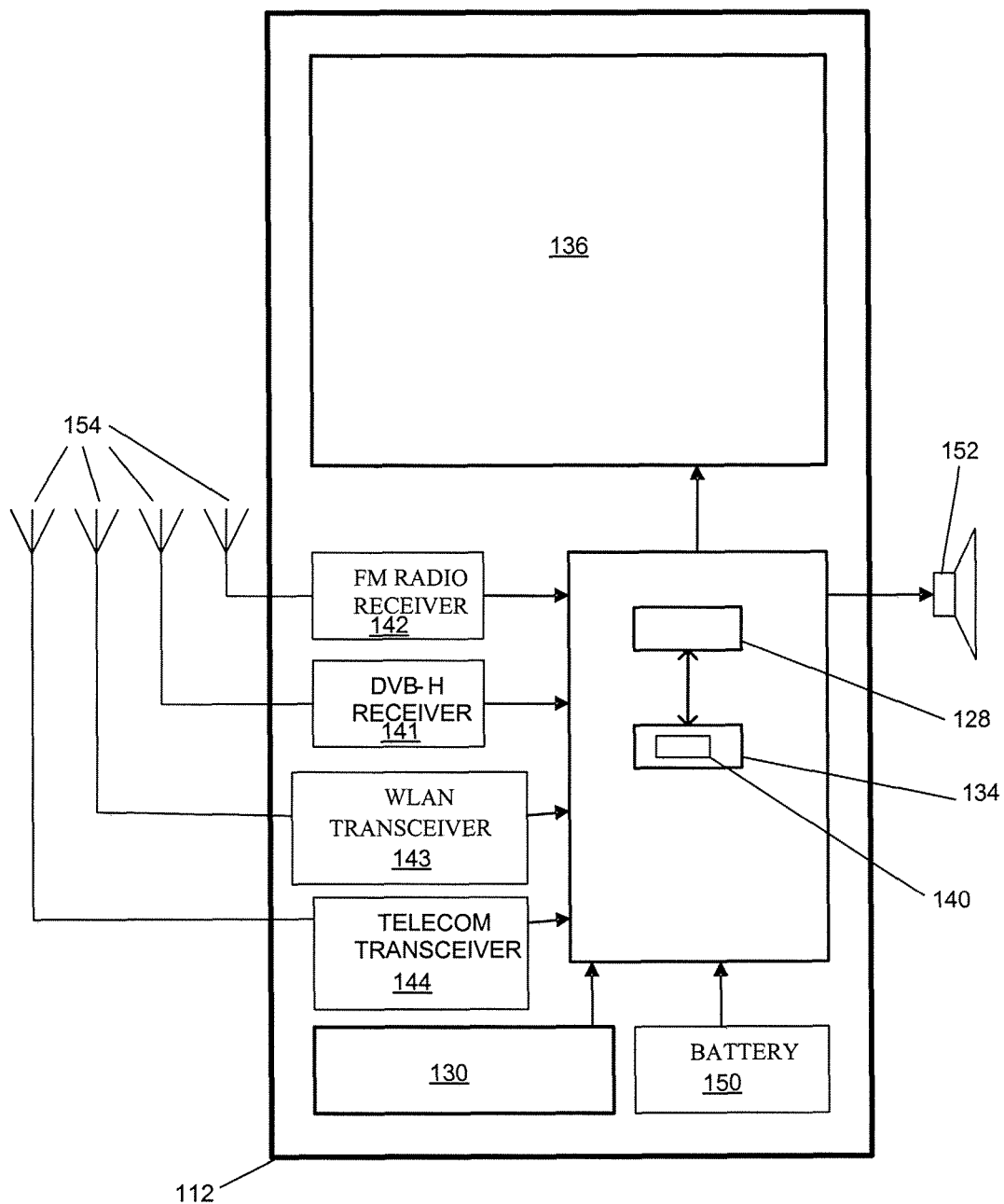


FIG. 2

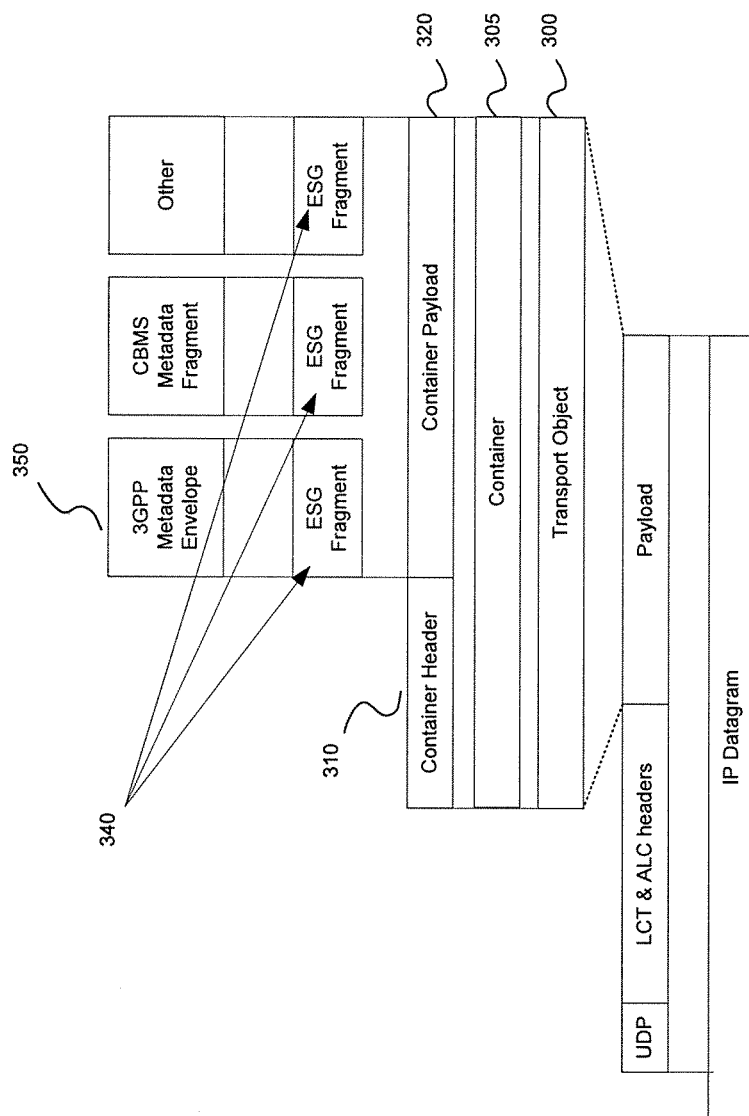


FIG. 3

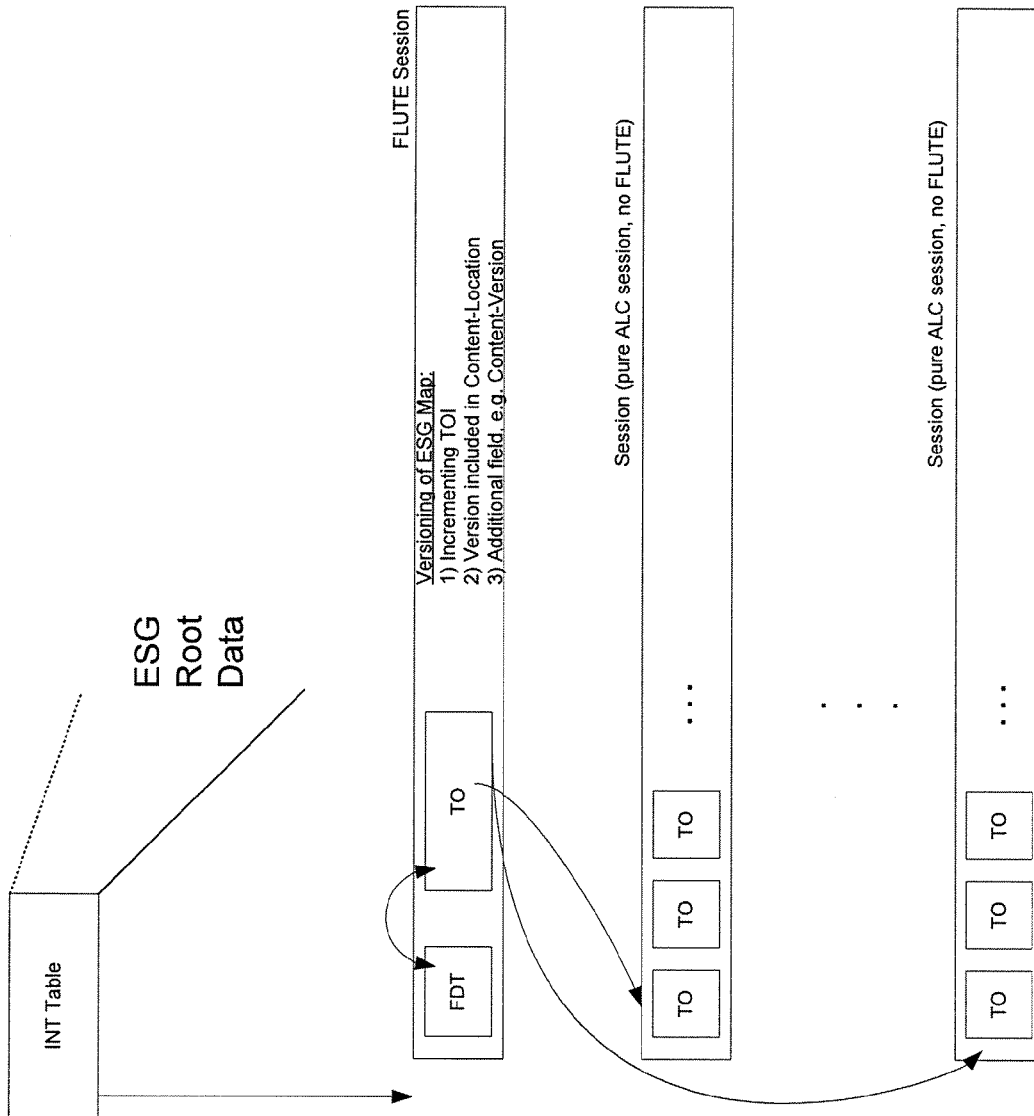


FIG. 4

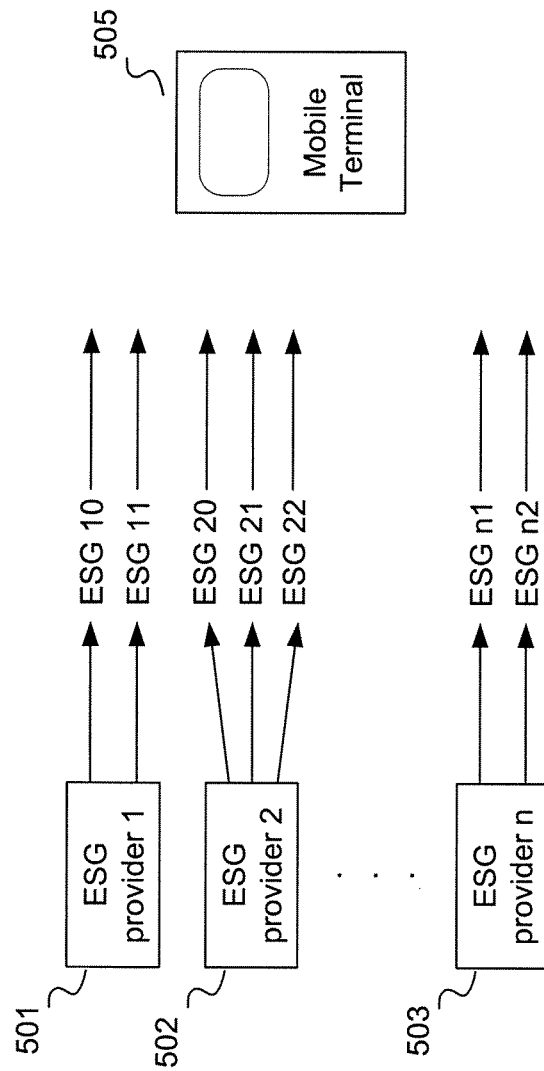


FIG. 5

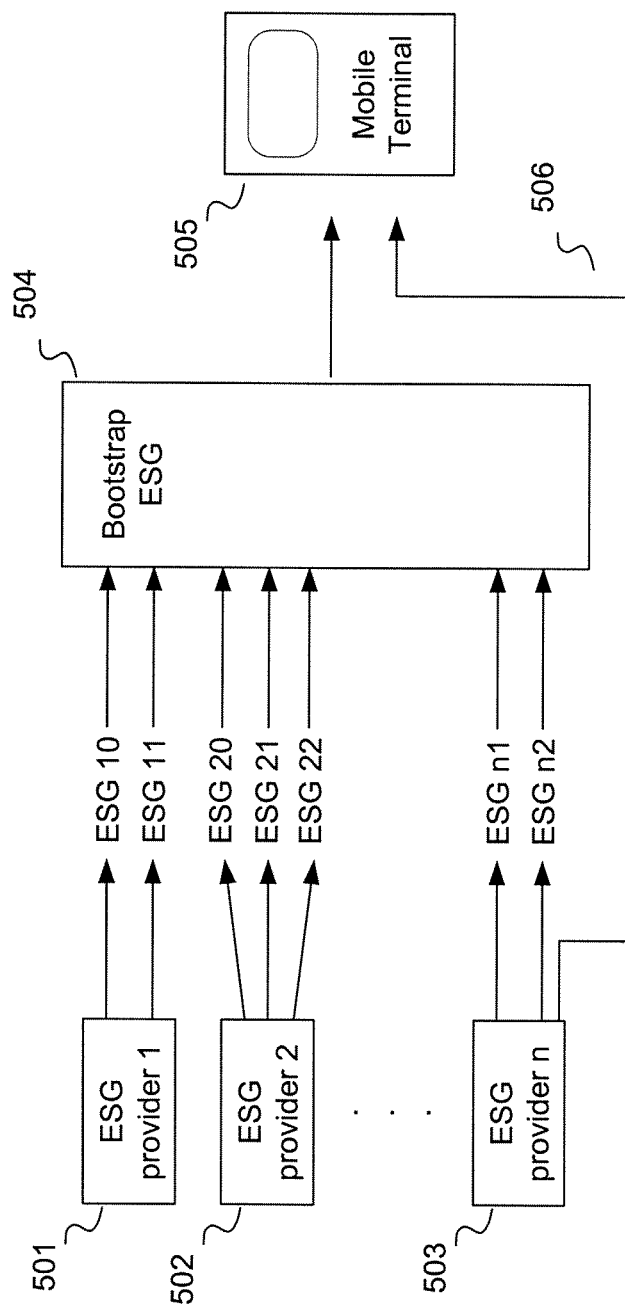


FIG. 6

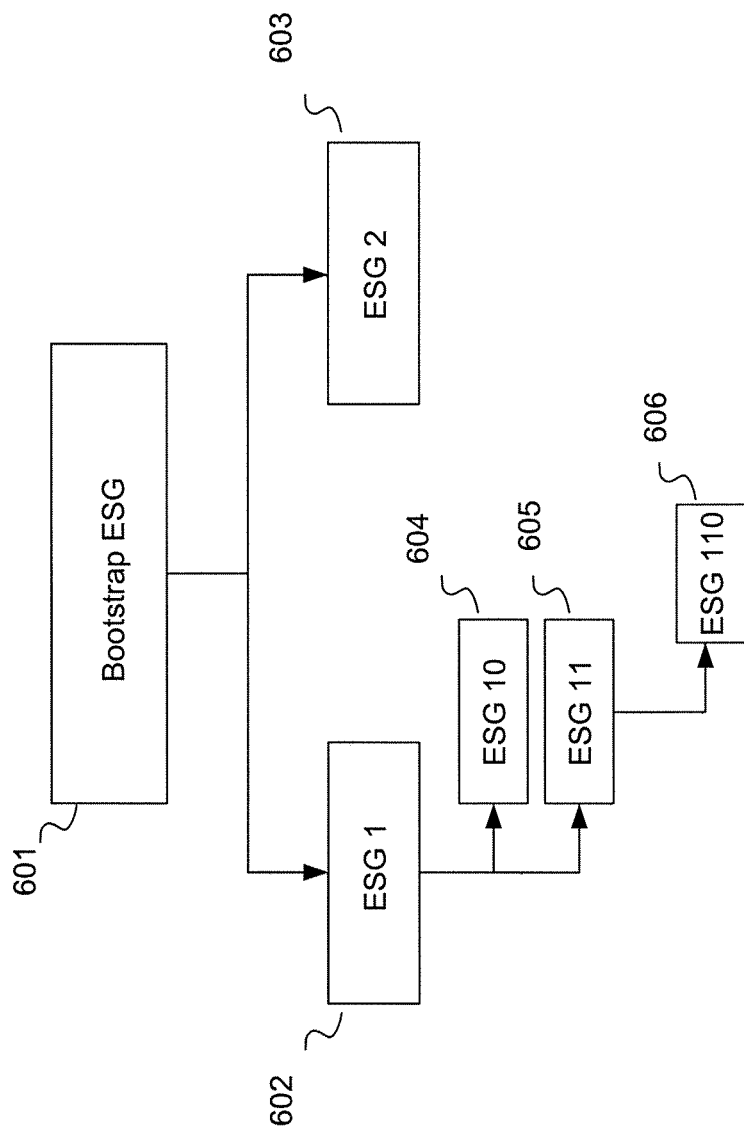


FIG. 7

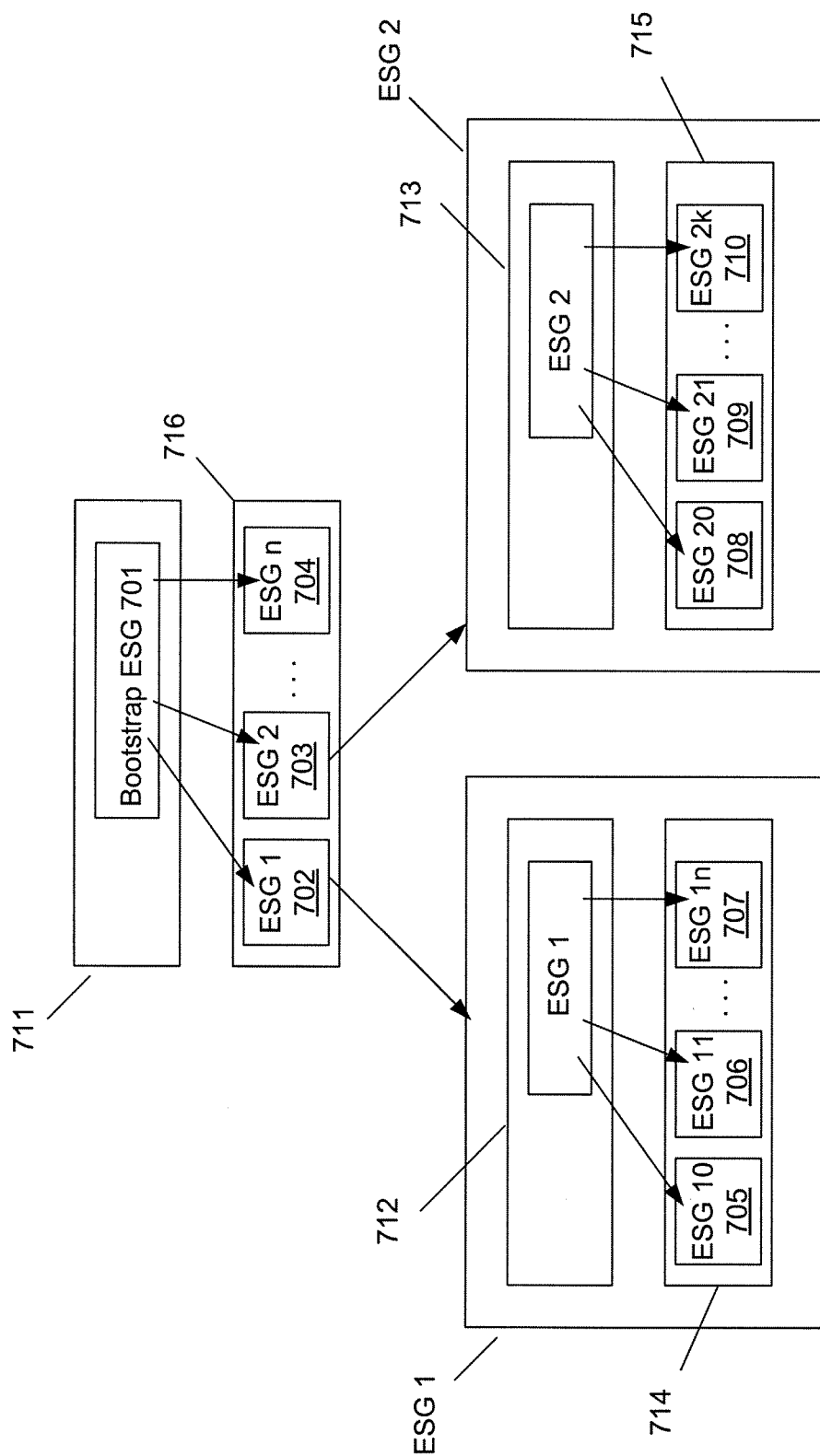


FIG. 8

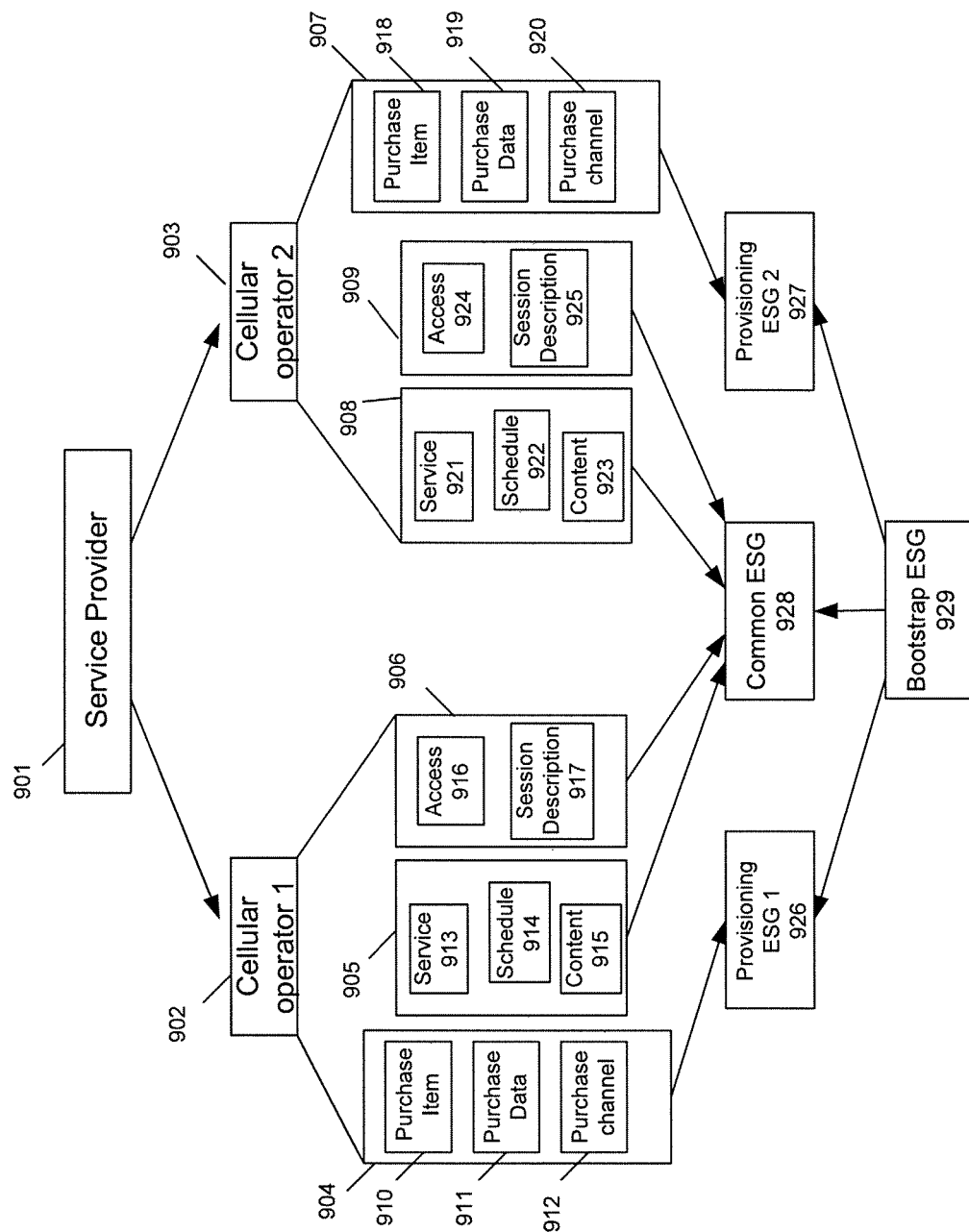


FIG. 9

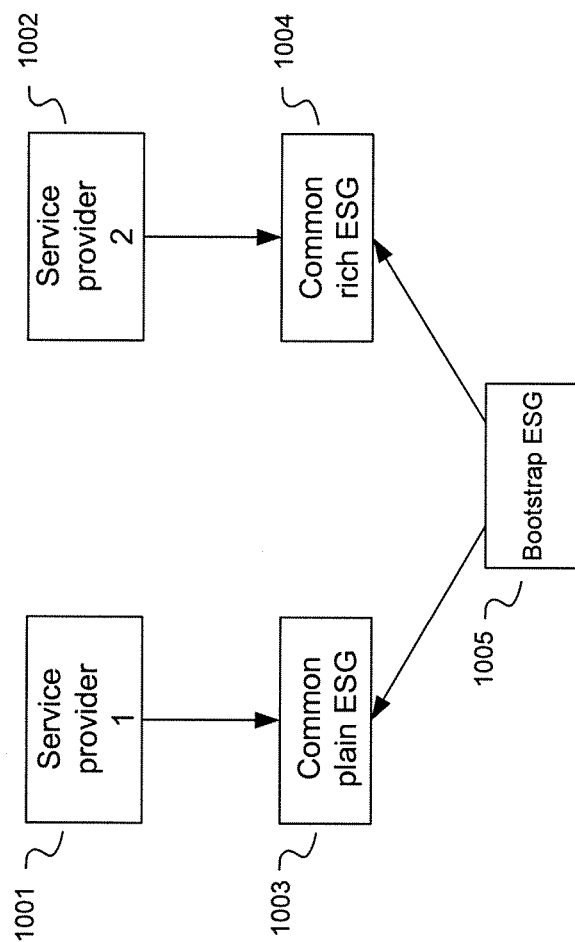


FIG. 10

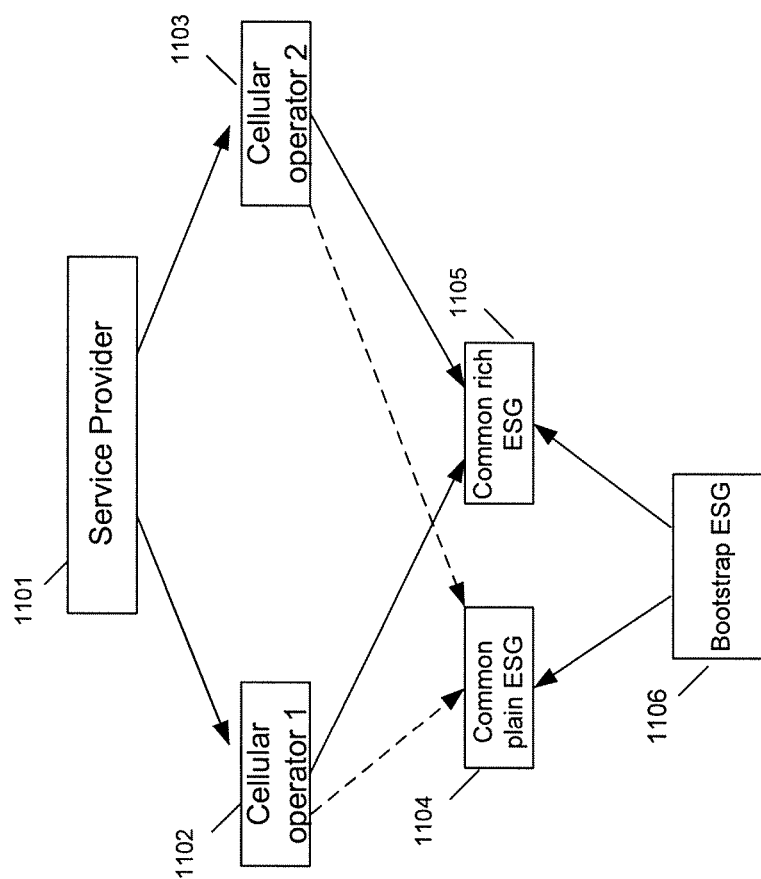


FIG. 11

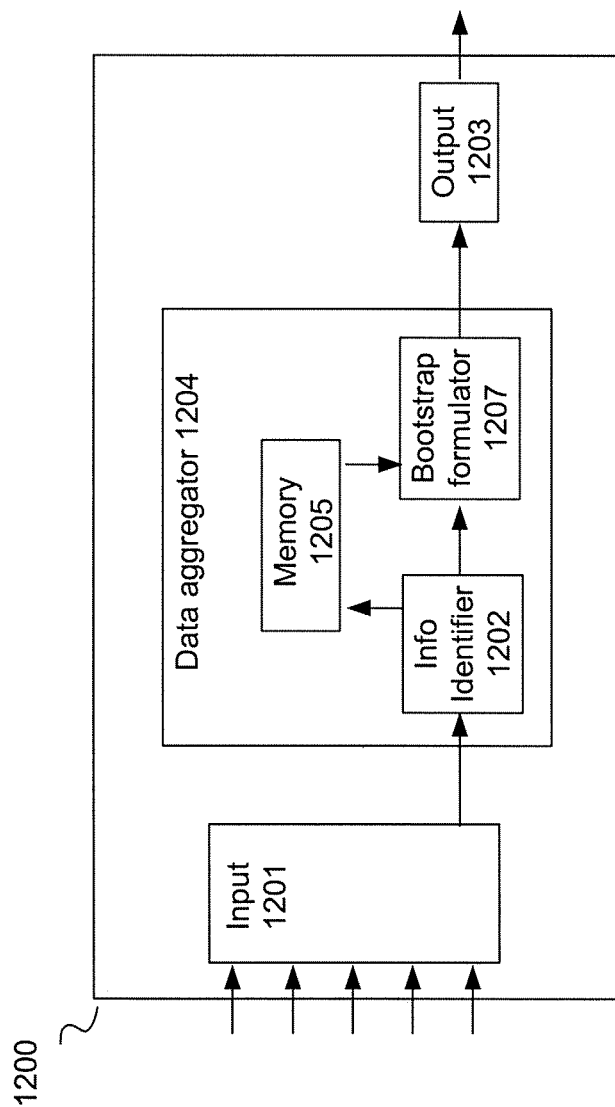


FIG. 12

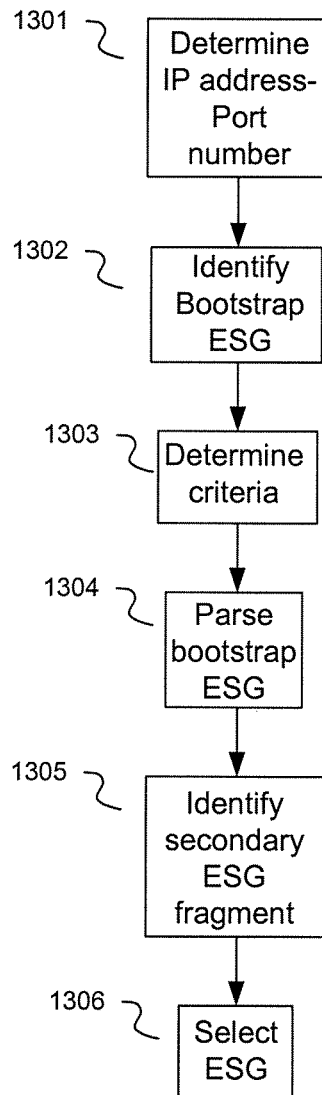


FIG. 13

1

IDENTIFYING SCOPE ESG FRAGMENTS AND ENABLING HIERARCHY IN THE SCOPE

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims the benefit of U.S. Provisional Application No. 60/731,926, which was filed Nov. 1, 2005, and which is incorporated herein by reference.

FIELD

Embodiments of the invention relate generally to communications networks. More specifically, embodiments of the invention provide for providing service guides in a hierarchical manner.

BACKGROUND

Generally, an Electronic Service Guide (ESG) enables a terminal to communicate what services are available to end users and how the services may be accessed. ESG fragments are independently existing pieces of the ESG. Traditionally, ESG fragments comprise XML documents, but more recently they have encompassed a vast array of items, such as for example, a SDP (Session Description Protocol) description, textual file, or an image. The ESG fragments describe one or several aspects of currently available (or future) service or broadcast programs. Such aspects may include for example: free text description, schedule, geographical availability, price, purchase method, genre, and supplementary information such as preview images or clips. Audio, video and other types of data comprising the ESG fragments may be transmitted through a variety of types of networks according to many different protocols. For example, data can be transmitted through a collection of networks usually referred to as the "Internet" using protocols of the Internet protocol suite, such as Internet Protocol (IP) and User Datagram Protocol (UDP). Data is often transmitted through the Internet addressed to a single user. It can, however, be addressed to a group of users, commonly known as multicasting. In the case in which the data is addressed to all users it is called broadcasting. The ESG data may be transmitted using different types of wireless digital networks including digital broadband broadcast and/or multicast networks.

Multiple programs or services are often provided simultaneously to a terminal or receiver. However, users often desire only one program or service at a time. With multiple programs or services being offered, the user may need to scan the entire frequency band to find the desired available service or program. This problem is compounded when the user is mobile because the programs or services available may change. Having to scan the entire frequency band each time to find a desired program or service is time consuming and frustrating.

Thus, there exists a need for a method and system for identifying desired programs or services in a communication network in a rapid, effective, and accurate manner.

BRIEF SUMMARY

The following presents a simplified summary in order to provide a basic understanding of some aspects of the invention. The summary is not an extensive overview of the invention. It is neither intended to identify key or critical elements of the invention nor to delineate the scope of the invention.

2

The following summary merely presents some concepts in accordance with embodiments of the invention in a simplified form as a prelude to the more detailed description below.

In one example, a method is provided for identifying a desired ESG from a list of ESG fragments. The list of ESG fragments may be a bootstrap ESG. For example, the bootstrap ESG may declare and contain information on, or refer to, other ESG fragments or secondary ESG fragments. The secondary ESG fragments may be in a hierarchical arrangement.

In another example, an apparatus is provided for providing a list of ESG fragments from a plurality of service providers or operators. The apparatus may be, for example, a service provider, an operator, or any other designated system or apparatus. In one example, an ESG aggregator is provided for receiving service guide information and assembling an ESG, such as a bootstrap ESG, to include information and contain information on, or refer to, the received service guide information. For example, the bootstrap ESG may contain information on, or refer to, other ESG fragments in a hierarchical arrangement.

In another example, a computer-readable medium is provided for identifying a desired ESG fragment in a list of ESG fragments or in a bootstrap ESG. The list of ESG fragments may be in a hierarchical arrangement.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the present invention and the advantages thereof may be acquired by referring to the following description in consideration of the accompanying drawings, in which like reference numbers indicate like features, and wherein:

FIG. 1 illustrates a block diagram of a wireless communication system in which various aspects of the invention may be implemented.

FIG. 2 illustrates a suitable digital broadcast receiver in which one or more illustrative embodiments of the invention may be implemented.

FIG. 3 illustrates a schematic diagram of an example of a transport object in which one or more illustrative embodiments of the invention may be implemented.

FIG. 4 illustrates examples of transporting single transport objects in which one or more illustrative embodiments of the invention may be implemented.

FIG. 5 illustrates an example of providing service guide information to a mobile terminal in which one or more illustrative embodiments of the invention may be implemented.

FIG. 6 illustrates another example of providing service guide information to a mobile terminal in which one or more illustrative embodiments of the invention may be implemented.

FIG. 7 illustrates an example of a bootstrap ESG and a hierarchical structure of service guide information in which one or more illustrative embodiments of the invention may be implemented.

FIG. 8 illustrates another example of a bootstrap ESG and hierarchical structure of service guide information in which one or more illustrative embodiments of the invention may be implemented.

FIG. 9 illustrates an example of providing service guide information in a bootstrap ESG in which one or more illustrative embodiments of the invention may be implemented.

FIG. 10 illustrates another example of providing service guide information in a bootstrap ESG in which one or more illustrative embodiments of the invention may be implemented.

FIG. 11 illustrates another example of providing service guide information in a bootstrap ESG in which one or more illustrative embodiments of the invention may be implemented.

FIG. 12 is a block diagram illustrating an example of an ESG aggregator in which one or more illustrative embodiments of the invention may be implemented.

FIG. 13 is a flowchart illustrating an example of identifying a desired ESG in a bootstrap ESG in which one or more illustrative embodiments of the invention may be implemented.

DETAILED DESCRIPTION

In the following description of the various embodiments, reference is made to the accompanying drawings, which form a part hereof, and in which is shown by way of illustration various embodiments in which the invention may be practiced. It is to be understood that other embodiments may be utilized and structural and functional modifications may be made without departing from the scope and spirit of the invention.

Aspects of the invention may be utilized across a broad array of networks and communication protocols. FIG. 1 illustrates an example of a wireless communication system 110 in which the systems and methods of the invention may be employed. One or more network-enabled mobile devices 112, such as a personal digital assistant (PDA), cellular telephone, mobile terminal, personal video recorder, portable television, personal computer, digital camera, digital camcorder, portable audio device, portable radio, or combinations thereof, are in communication with a service source 122 through a broadcast network 114 and/or cellular network 116. The mobile terminal/device 112 may comprise a digital broadband broadcast receiver device. The service source 122 may be connected to several service providers that may provide their actual program content or information or description of their services and programs to the service source that further provides the content or information to the mobile device 112. The several service providers may include but are not limited to one or more television and/or digital television service providers, AM/FM radio service providers, SMS/MMS push service providers, Internet content or access providers.

One way of broadcasting data is to use an IP datacasting (IPDC) network. IPDC is a combination of digital broadcast and Internet Protocol. Through such an IP-based broadcasting network, one or more service providers can supply different types of IP services including on-line newspapers, radio, and television. These IP services are organized into one or more media streams in the form of audio, video and/or other types of data. To determine when and where these streams occur, users refer to an electronic service guide (ESG). One example used in digital video broadcasting (DVB) streams is an electronic program guide (EPG). One type of DVB is Digital video broadcasting-handheld (DVB-H), a recently developed technology that increases the capabilities and services available on small handheld devices, such as mobile telephones. The DVB-H is designed to deliver 10 Mbps of data to a battery-powered terminal device.

DVB transport streams deliver compressed audio and video and data to a user via third party delivery networks. Moving Picture Expert Group (MPEG) is a technology by which encoded video, audio, and data within a single program is multiplexed, with other programs, into a transport stream (TS). The TS is a packetized data stream, with fixed length packets, including a header. The individual elements of a program, audio and video, are each carried within packets

having a unique packet identification (PID). To enable a receiver device to locate the different elements of a particular program within the TS, Program Specific Information (PSI), which is embedded into the TS, is supplied. In addition, additional Service Information (SI), a set of tables adhering to the MPEG private section syntax, may be incorporated into the TS. This enables a receiver device to correctly process the data contained within the TS.

Aspects of the invention, however, are also applicable to other traditional digital mobile broadcast systems such as, for example, T-DAB, T/S-DMB, ISDB-T, ATSC, MediaFLO, and non-traditional systems such as 3GPP MBMS and 3GPP2 BCMCS.

The broadcast network 114 may include a radio transmission of IP datacasting over DVB-H. The broadcast network 114 may broadcast a service such as a digital or analog television signal and supplemental content related to the service via transmitter 118. The broadcast network may also include a radio, television or IP datacasting broadcasting network. The broadcast network 114 may also transmit supplemental content which may include a television signal, audio and/or video streams, data streams, video files, audio files, software files, and/or video games. In the case of transmitting IP datacasting services, the service source 122 may communicate actual program content to user device 112 through the broadcast network 114 and additional information such as user right and access information for the actual program content through the cellular network 116.

The mobile device 112 may also contact the service source 122 through the cellular network 116. The cellular network 116 may comprise a wireless network and a base transceiver station transmitter 120. The cellular network may include a second/third-generation (2G/3G) cellular data communications network, a Global System for Mobile communications network (GSM), a Universal Mobile Telecommunications System (UMTS) or other wireless communication network such as a WLAN network.

In one aspect of the invention, mobile device 112 may comprise a wireless interface configured to send and/or receive digital wireless communications within cellular network 116. The information received by mobile device 112 through the cellular network 116 or broadcast network 114 may include user selection, applications, services, electronic images, audio clips, video clips, and/or WTAI (Wireless Telephony Application Interface) messages. As part of cellular network 116, one or more base stations (not shown) may support digital communications with receiver device 112 while the receiver device is located within the administrative domain of cellular network 116.

As shown in FIG. 2, mobile device 112 may include processor 128 connected to user interface 130, memory 134 and/or other storage, and display 136. Mobile device 112 may also include battery 150, speaker 152 and antennas 154. User interface 130 may further include a keypad, touch screen, voice interface, four arrow keys, joy-stick, data glove, mouse, roller ball, touch screen, or the like.

Computer executable instructions and data used by processor 128 and other components within mobile device 112 may be stored in a computer readable medium, e.g., computer readable memory 134. The memory may be implemented with any combination of read only memory modules or random access memory modules, optionally including both volatile and nonvolatile memory. Software 140 may be stored within memory 134 and/or storage to provide instructions to processor 128 for enabling mobile device 112 to perform various functions. Alternatively, some or all of mobile device

5

112 computer executable instructions may be embodied in hardware or firmware (not shown).

Mobile device 112 may be configured to receive, decode and process digital broadband transmissions that are based, for example, on the Digital Video Broadcast (DVB) standard, such as DVB-H, DVB-T or DVB-MHP, through a specific DVB receiver 141. The mobile device may also be provided with other types of receivers for digital broadband broadcast transmissions. Additionally, receiver device 112 may also be configured to receive, decode and process transmissions through FM/AM Radio receiver 142, WLAN transceiver 143, and telecommunications transceiver 144. In one aspect of the invention, mobile device 112 may receive radio data stream (RDS) messages.

In an example of the DVB standard, one DVB 10 Mbit/s transmission may have 200 50-kbit/s audio program channels or 50 200-kbit/s video (TV) program channels. The mobile device 112 may be configured to receive, decode, and process transmission based on the Digital Video Broadcast-Handheld (DVB-H) standard or other DVB standards, such as DVB-MHP, DVB-Satellite (DVB-S), DVB-Terrestrial (DVB-T) or DVB-Cable (DVB-C). Similarly, other digital transmission formats may alternatively be used to deliver content and information of availability of supplemental services, such as ATSC (Advanced Television Systems Committee), NTSC (National Television System Committee), ISDB-T (Integrated Services Digital Broadcasting-Terrestrial), DAB (Digital Audio Broadcasting), DMB (Digital Multimedia Broadcasting), FLO (Forward Link Only) or DIRECTV. Additionally, the digital transmission may be time sliced, such as in DVB-H technology. Time-slicing may reduce the average power consumption of a mobile terminal and may enable smooth and seamless handover. Time-slicing consists of sending data in bursts using a higher instantaneous bit rate as compared to the bit rate required if the data were transmitted using a traditional streaming mechanism. In this case, the mobile device 112 may have one or more buffer memories for storing the decoded time sliced transmission before presentation.

In one example of the invention, ESG fragments may be delivered to a subscriber terminal in one or more data streams or channels. In this example, a plurality of channels (such as IP-packet streams) can be used to deliver ESG information to the subscriber terminal. For example, the ESG fragment may provide the subscriber terminal with notification of upcoming events to be provided by a service provider, changes in current events provided by a service provider or updated or on-going information for a user or group of users.

ESG fragments may be delivered in a transport object which may transport ESG information in a container. Thus, ESG fragments may be placed in a container that may be delivered in its own transport object. The container may further include a container header and a container payload, for example, in which the container header may provide information on where each container is located within the transport object. In one example, the transport object may contain a single container or a plurality of containers, each container including at least one ESG fragment. FIG. 3 is a diagram of an example transport object in accordance with at least one aspect of the invention. As illustrated in the example of FIG. 3, a transport object 300 may comprise a container that may include a container header 310 and a container payload 320. In one example, the container header 310 and the container payload 320 are incorporated into a single container 305 which may be incorporated into a single transport object 300 so that the container header 310 need not be recombined with information regarding where each container is located within

6

different transported objects. Alternatively, the transport object 300 may contain a plurality of containers and a container may contain any number of ESG fragments 340. The container header 310 may contain information associated with a corresponding ESG fragment such as, for example, information regarding the container header 310 itself and/or the container payload 320.

In the example illustrated in FIG. 3, the ESG fragment 340 is contained in the container payload 320. The container header 310 may contain descriptors for identifying and describing ESG fragments in the corresponding container payload 320. Thus, the characteristics of the ESG fragment may be identified, such as but not limited to the position of the ESG fragment in the transport object 300 or the length of each contained ESG fragment 340. For example, in one embodiment, a field specifies where the particular ESG begins within the container payload 320 by providing, for example, an offset value, start and end points, or the like. In other embodiments, metadata 350 may be associated with the individual ESG fragments 340, located within or proximate to the header 310, descriptor entries, an ESG fragment 340 or a mixture thereof. In one exemplary embodiment, the association of a 3GPP metadata envelope with an ESG fragment 340 may substitute, or negate the need, for additional metadata to be located in the header 310 in relation to that particular ESG fragment.

FIG. 4 illustrates an example of transmitting a plurality of single Transport Objects. As illustrated in FIG. 4, the Transport Objects (TO) of the current invention may be carried in, for example, FLUTE (File Delivery over Unidirectional Transport) sessions, or a pure Asynchronous Layered Coding (ALC) session. In the example of FIG. 4, the ESG Root Channel data, such as IP Address, port number and Transport Session Identifier (TSI), are announced in the IP/MAC Notification Table (INT Table) which may be, for example, carried in the SI/PSI stream in DVB-H as one of the SI tables of DVB-H. The FLUTE session of the ESG Root Channel comprises a File Delivery Table (FDT) of the session and one or more Transport Objects (TO). These Transport Objects that may be delivered in announcement carousels contain mapping between the different parts of ESGs and access parameters to the different ESG methods in which the ESG data is transmitted. The ESGs may differ from each other. For example, ESGs may be in different languages, genres or encoding.

Examples of access parameters may include, for example, IP Addresses, port numbers, TSIs, start and end times etc. The FLUTE session thus declares how the ESG data is distributed to different sessions. The TOs of the FLUTE session carrying this mapping data are described in the FDT of the FLUTE session. The ESG mapping data may be delivered in one or multiple TOs. The mapping can be made using XML Schema, plain ASCII text, Structured ASCII text such as multipart MIME or MIME headers, as binary with enumerated types or through various other means as is known in the art. The ESG data in this example may be delivered in one or more TOs, which may be within pure ALC sessions, for example. The ESG data or parts of it may be delivered in some embodiments of the invention in one or more FLUTE sessions in addition to, or instead of, ALC sessions.

A mobile terminal or receiver may receive multiple programs or services and multiple associated ESG fragments. Different ESG fragments may provide different services, programs, or content. In addition, there may be different provisioning information associated with different ESG fragments or their associated programs or services. In the event that there are multiple ESG fragments being received at a mobile

7

terminal or receiver, the mobile terminal or receiver may choose a desired ESG fragment to receive. For example, if two service providers each provide a corresponding ESG fragment, then the mobile terminal or receiver would choose between the two incoming ESG fragments.

The different ESG fragments may vary in scope or details. In one example to illustrate, one of the ESG fragments may contain basic information regarding the corresponding program or service. The basic information may include, for example, a name of a program or a time of broadcast of the program. The other ESG fragment may include more detailed information. For example, the other more detailed ESG fragment may contain information regarding biographies of the actors, interviews with the actors or other individuals involved with the program, interactive services, etc. In this way, different information may be provided depending on the ESG fragment being transmitted and received.

The different ESG fragments may differ in accessibility. For example a first ESG fragment may contain basic information on a program and may be free to the subscriber. However, a second ESG fragment with more detailed information regarding the program (e.g., biographies of the actors, etc.) may be available for a fee only. In this example, ESG fragments may further include purchasing information, if applicable.

The ESG fragments may further vary based on validity and availability. One ESG fragment may be available between certain dates and times while another ESG fragment may be available between different dates and times. This information (i.e., validity information) may further be included in the corresponding ESG fragments.

FIG. 5 illustrates one example of multiple ESG fragments being transmitted to a terminal or receiver. In this example, *n* ESG providers are illustrated (1–*n*), each transmitting corresponding ESG fragments. For example, ESG provider 1 (501) provides ESG 10 and ESG 11, ESG provider 2 (502) provides ESG fragments 20, 21, and 22, and ESG provider *n* (503) provides ESG *n*1 and ESG *n*2 to mobile terminal 505. In this example, mobile terminal 505 may select a desired ESG fragment from the available ESG fragments. Thus, the mobile terminal 505 may select a desired ESG fragment from ESG 10, 11, 20, 21, 22, . . . *n*1, and *n*2. For example, the mobile terminal 505 may scan the frequency band in order to find the available services. Based on the available services as indicated by the available ESG fragments, the mobile terminal 505 may select a desired ESG.

FIG. 6 illustrates an example of the present invention in which a bootstrap ESG is provided for managing incoming ESG fragments from ESG providers. In this example, multiple ESG providers, each different in scope, are transmitting corresponding ESG fragments. For example, ESG provider 1 (501) transmits ESG 10 and ESG 11 and ESG provider 2 (502) transmits ESG 20, ESG 21, and ESG 22. There may be any number of ESG providers providing any number of ESG fragments. In the example illustrated in FIG. 6, there are *n* ESG providers. ESG provider *n* (503) transmits ESG *n*1 and ESG *n*2 to the mobile terminal 505.

Also in this example, a bootstrap ESG 504 is provided which may provide information on the availability or scope of individual ESG fragments to a user. The bootstrap ESG 504 contains information for each of the incoming ESG fragments from the ESG providers (501, 502, 503) such that a mobile terminal 505 may access the information in the bootstrap ESG 504 to obtain information on the individual ESG fragments (herein alternatively referred to as “secondary ESG fragments”). The information in the bootstrap ESG 504 may include, for example, identification information (e.g., Opera-

8

tor ID), IP address or port number for ESG fragments or corresponding ESG providers, purchasing information for the ESG (e.g., if ESG is free for everyone, free for registered users only, or if there is a charge for the ESG), purchasing channel associated with the ESG (e.g., access to purchasing the ESG), URI of the ESG, service provider identifier, last update of the ESG fragment, next expected update of the ESG fragment, validity dates or times for each corresponding ESG fragment. In this example, a mobile terminal 505 may identify desired ESG fragments. For example, a mobile terminal 505 may wish to receive certain ESG fragments from certain ESG providers that are valid during certain times or dates. By accessing the bootstrap ESG 504, the mobile terminal 505 is provided with information on secondary ESG fragments from which to choose. Also, any ESG fragment may be delivered to the mobile terminal 505 directly without being referred to in the bootstrap ESG 504 if desired, as illustrated by element 506 in FIG. 6.

In addition, the information on ESG fragments in the bootstrap ESG 504 may be used to update the information in the mobile terminal 505. Updated information may be received from the bootstrap ESG 504 such that the mobile terminal may contain current information regarding the ESG fragments. In one example, updating of the ESG fragments in the mobile terminal 505 may occur continuously to provide the latest information. In this example, the mobile terminal 505 may monitor the IP address associated with the bootstrap ESG 504 by listening to the corresponding IP address. When an update is available, for example, in one of the ESG fragments in the bootstrap ESG 504, the update may be transmitted to the mobile terminal, and the mobile terminal may receive the update. Alternatively, ESG fragment information in the bootstrap ESG 504 may be updated when an update is announced or when an update is expected.

In addition, the information in the bootstrap ESG 504 may be updated from the individual ESG providers. For example, the bootstrap ESG 504 may receive updated information when available from the corresponding ESG providers. Alternatively, updates may be sent on a periodic basis.

The bootstrap ESG 504 may be provided in a variety of ways. In one example, one ESG provider may provide the bootstrap ESG 504. In this example, the different ESG providers may agree to designate one of the ESG providers as providing the bootstrap ESG 504. After an ESG provider is chosen to provide the bootstrap ESG 504, the ESG providers provide the designated ESG provider with necessary ESG fragments or links to the ESG data. ESG providers may further provide a combination of ESG fragments and links to ESG fragments. Based on the information received, the designated ESG provider provides the bootstrap ESG. Alternatively, a separate entity may be elected to provide the bootstrap ESG 504. For example, an ESG aggregator may be selected to provide the bootstrap ESG 504. The ESG providers may provide the necessary ESG fragment data to the ESG aggregator. The ESG aggregator may create the bootstrap ESG 504 to include, for example, operator identification information, IP address-port number, etc. It is noted that any entity may serve as an ESG aggregator. As another example, the ESG aggregator may be a datacast operator (i.e., a network operator that delivers services of different operators or service providers).

The bootstrap ESG 504 may be identified by a mobile terminal 505 by using service discovery methods. For example, the bootstrap ESG may have a fixed IP address and/or port number. In this example, the bootstrap ESG 504 may contain data tables and/or descriptors including identifier information. Such identifier information may include, for

example, a character string descriptor element describing the IP address of the bootstrap ESG **504**. Also, the bootstrap ESG **504** may contain an identifier for a port address. The mobile terminal **505** may search the identifier information of the bootstrap ESG **504** and may determine the existence of the bootstrap ESG **504**. Based on the information provided in the bootstrap ESG **504**, a mobile terminal **505** may identify the bootstrap ESG **504**.

Thus, in this example, a mobile terminal **505** may identify a bootstrap ESG **504** by identifying parameters within the bootstrap ESG **504** that may describe an IP address or port address corresponding to the bootstrap ESG **504**. The bootstrap ESG **504** may contain updated ESG fragment information from ESG service providers (**501**, **502**, **503**). This information may be continuously updated, periodically updated, or updated when an update is announced or when an update is expected. The bootstrap ESG **504** may further provide the information to the mobile terminal **505**. For example, the bootstrap ESG **504** may provide identifier or descriptive information on an operator, an IP address-port number, purchasing information (e.g., information on buying or subscribing to the ESG), a service provider identifier, etc.

The mobile terminal **505** may update information already contained in the mobile terminal **505** with updated information from the bootstrap ESG **504**. In this example, a desired ESG fragment is selected from the bootstrap ESG **504** and downloaded to the mobile terminal **505**. A user at a mobile terminal **505** may view a list of available ESG fragments and may select a desired ESG fragment from the list. In one example, different types of ESG fragments may be identified by any number of identifying symbols, colors, etc. For example, free ESGs may be displayed in a different color or font than purchasable ESGs.

In addition, the user at a mobile terminal **505** may also request a bootstrap ESG **504**. In this example, a user at the mobile terminal **505** may send a request for the bootstrap ESG by specifying a corresponding IP address-port number combination. The user at the mobile terminal **505** may receive access parameters in response to the request. Based on the access parameters received, the mobile terminal **505** may receive information for tuning the mobile terminal to the corresponding announcement channel to receive the desired ESG fragment. Alternatively, the user at the mobile terminal **505** may also receive a cellular broadcast to receive access information for the desired bootstrap ESG **504**.

As described above, a bootstrap ESG may contain information on ESG fragments (e.g., secondary ESG fragments). In addition, ESG fragments may be nested within other ESG fragments such that an ESG fragment may contain information on another ESG fragment. In addition, a bootstrap ESG may contain information on another bootstrap ESG. FIG. 7 is a block diagram illustrating an example of a hierarchical relationship between ESG fragments and bootstrap ESG fragments. As FIG. 7 illustrates, a bootstrap ESG **601** refers to, or contains, information pertaining to two ESG fragments, ESG **1 (602)** and ESG **2 (603)**. Bootstrap ESG **601** may also update the information pertaining to the ESG **1 (602)** and ESG **2 (603)** as needed, for example, by updating the information when an update is announced or expected or by listening to the IP address of the ESG providers and downloading the updated information. The information stored and provided in the bootstrap ESG **601** may include, for example, identification information, IP address-port number, or other information pertaining to the ESGs. In addition, the bootstrap ESG **601** may also contain an IP address and port number, for example, as a descriptor or within data tables, such that a user at a mobile terminal may identify the bootstrap ESG.

In the example illustrated in FIG. 7, ESG **1** further contains information on additional ESGs. As illustrated, ESG **1** informs ESG **10 (604)** and ESG **11 (605)**. Hence, in this example, ESG **10 (604)** and ESG **11 (605)** may be subsets of ESG **1**. Also illustrated in this example, ESG **11 (605)** contains information on ESG **110 (606)** which is a subset of ESG **11 (605)**. Any ESG may contain data from any other ESGs. For example, ESGs lower in the hierarchy may contain data from any ESG higher in the hierarchy. To illustrate this example, any of ESG **10 (604)** or ESG **11 (605)** may contain data from other ESGs higher in the hierarchy that are not in the direct chain of the ESGs such as ESG **2 (603)**. Likewise, ESGs may contain data from any ESG lower in the hierarchy. For example, ESG **2 (603)** may contain data from ESG **110 (606)**.

In addition, ESGs may contain information on any other ESG. In one example, an ESG higher in the hierarchy may contain information on or refer to any ESG lower in the hierarchy. To illustrate this example, the bootstrap ESG **601** may contain information on ESG **10 (604)** or ESG **11 (605)**. In this example, an ESG skips levels to contain information on other ESG fragments that are more than one level below in the hierarchy. Alternatively, ESGs that are in different branches of the hierarchy may contain information on other ESGs. As an example to illustrate, ESG **2 (603)** may contain information on ESG **10 (604)**, ESG **11 (605)**, or ESG **110 (606)**.

In another example, any ESG may also be a bootstrap ESG and may provide information on the scope or details of other ESG fragments. For example, an ESG lower in the hierarchy may also be a bootstrap ESG. As FIG. 6 illustrates, ESG **1 (602)** may also be a bootstrap ESG that informs ESG **10 (604)** or ESG **11 (605)**.

FIG. 8 illustrates another example of an ESG fragment hierarchy. In this example, a bootstrap ESG **701** is transmitted over a bootstrap ESG announcement channel **711**. Information on the bootstrap ESG is provided to a user at a mobile terminal. This information may include, for example, identifier information for the bootstrap ESG **701** itself or method of accessing the bootstrap ESG **701**. Similarly, the ESGs that the bootstrap ESG **701** refers to, or in which bootstrap ESG **701** contains information, may be provided to a user at a mobile terminal over a bootstrap ESG delivery channel **716**. In this example, the bootstrap ESG **701** contains information on n ESGs (ESG **1 (702)**, ESG **2 (703)**, ESG n (**704**)). Each of the ESGs in which the bootstrap ESG contains information may contain information in an ESG announcement channel. For example, ESG **1 (702)** may provide information on ESG announcement channel **712**. This information may include, for example identifier information for ESG **1** or information on accessing ESG **1**. Likewise, identifier or access information for ESG **2** may be provided via ESG announcement channel **713**.

As FIG. 8 illustrates, each of ESG **1 (702)** and ESG **2 (703)** may contain information on other ESGs. ESG **1 (702)** contains information on n ESGs that may be delivered over an ESG delivery channel, including ESG **10 (705)**, ESG **11 (706)** and ESG $1n$ (**707**), and ESG **2 (703)** informs k ESGs, including ESG **20 (708)**, ESG **21 (709)** and ESG $2k$ (**710**). ESG **10 (705)**, ESG **11 (706)** and ESG $1n$ (**707**) may be delivered over ESG delivery channel **714**. Likewise, ESG **20 (708)**, ESG **21 (709)** and ESG $2k$ (**710**) may be delivered over ESG delivery channel **715**.

In another example, ESG **1 (703)** may be a second level bootstrap ESG that may announce or declare other ESGs such as ESG **10 (705)**, ESG **11 (706)** and ESG $1n$ (**707**). To illustrate, ESG **1** may be an ESG corresponding to programming

11

services that may contain information on ESG 10 (705) corresponding to a live ice hockey game and ESG 11 (706) corresponding to all movies having a parental rating of at least 12 years of age.

FIG. 9 illustrates another example of arrangement of ESGs. In this example, a service provider 901 provides ESG data to several cellular operators. As illustrated, service provider 901 provides ESG data to cellular operator 1 (902) and cellular operator 2 (903). Each cellular operator (902 and 903) provides its own provisioning fragments (904 and 907, respectively). The provisioning fragments include purchase item (910, 918), purchase data (911, 919), and purchase channel (912, 920). However, each cellular operator (902 and 903) also provides a respective core (905, 908) and access (906, 909) fragments. The core fragments (905, 908) contain the respective service fragments (913, 921), schedule fragments (914, 922) and content fragments (915, 923), and the access fragments (906, 909) contain the respective access fragments (916, 924) and session description fragments (917, 925).

In this example, the ESG data is from a single service provider 901 and is therefore common to both cellular operators (902, 903). However, each of the cellular operators (902, 903) may also have different provisioning fragments (904, 907) as each cellular operator (902, 903) may have different purchasing requirements. Thus, in this example, a bootstrap ESG 929 may declare a common ESG fragment 928 that contains the ESG fragments in common with the two cellular operators (902, 903) in one ESG fragment (e.g., the respective service, schedule, content, access, and session description fragments). Also, each of the respective provisioning fragments (904, 907) may be placed into separate ESG fragments, such as provisioning ESG 1 (926) and provisioning ESG 2 (927), respectively. The ESG fragments containing the respective provisioning fragments may also be declared or referred to by the bootstrap ESG 929, as illustrated in FIG. 9.

FIG. 10 illustrates another example of a bootstrap ESG in accordance with embodiments of the invention. In this example, multiple service providers provide ESG fragments pertaining to a program or service. Service provider 1 (1001) provides basic information on the corresponding program or service. This may include, for example, a name or identifier of the program or service. This information may be contained in a common plain ESG 1003. Service provider 2 (1002) provides more detailed information on the corresponding program or service. This detailed information may include, for example, a biography of the actors, interviews, interactive services, or provisioning information and may be included in a common rich ESG 1004. The bootstrap ESG 1005 may declare or contain information on both the common plain ESG 1003 and the common rich ESG 1004. In addition, the bootstrap ESG 1005 may associate the common rich ESG 1004 with provisioning information pertaining to the corresponding program or service. Hence, a mobile terminal may access the bootstrap ESG 1005 and obtain specific information via separate ESG fragments (e.g., common plain ESG 1003 or common rich ESG 1004). In another example, the common plain ESG 1003 may be freely available and the common rich ESG 1004 may be available only to registered members or alternatively available only for a fee. In any case, the bootstrap ESG 1005 may provide information pertaining to the ESG fragments (common plain ESG 1003 and common rich ESG 1004) to the mobile terminal so that a user at the mobile terminal may select the desired information.

FIG. 11 illustrates another example of a bootstrap ESG. In this example, a service provider 1101 provides ESG data to multiple cellular operators (e.g., cellular operator 1 (1102) and cellular operator 2 (1103)). Both of the illustrated cellular

12

operators (1102, 1103) provide a single set of provisioning information. This information may be included in a common rich ESG 1105. However, each of the cellular operators (1102, 1103) provides different representations of the content of the corresponding program or service. The data for the different representations of the content may be included in a common plain ESG 1104 as illustrated in FIG. 11. Hence, both cellular operators (1102, 1103) may associate a single set of provisioning information (included in common rich ESG 1105) with multiple representations for content (included in common plain ESG 1104). The purchase data and purchase items (i.e., provisioning information) may refer to services in the common plain ESG 1104. The bootstrap ESG 1106 informs both the common rich ESG 1105 and the common plain ESG 1104 to a mobile terminal (not shown). Hence, a user at a mobile terminal may receive information on ESG fragments and be informed of the contents and provisioning information of corresponding programs or services.

A bootstrap ESG may be created by any apparatus capable of assembling service guide data to provide to a mobile terminal. For example, an ESG provider or operator or a datacast operator may be designated as an apparatus or system for providing a bootstrap ESG. Also, a separate apparatus or system may be designated to provide the bootstrap ESG. FIG. 12 is a block diagram illustrating an example of an apparatus for creating a bootstrap ESG. In this example, an ESG aggregator 1200 is provided for receiving information pertaining to a service guide from a plurality of sources, such as ESG providers, and creating a bootstrap ESG. The ESG aggregator 1200 illustrated in FIG. 12 includes an input 1201 for receiving data from a service guide data source. For example, a service provider or ESG provider may transmit ESG data fragments or links to ESG data to the ESG aggregator 1200. The input 1201 of the ESG aggregator 1200 may receive the data or links to data and include the data in a bootstrap ESG.

The ESG aggregator 1200 may also include a data aggregator 1204. The data aggregator 1204 may receive service guide information from input 1201 which may receive the information from a plurality of service providers or a plurality of operators. The information may be included in a bootstrap ESG. For example, an operator identifier may be received from a first operator and associated service guide information for a corresponding program or service. The information may be received at the input 1201 and may be included within a bootstrap ESG by the data aggregator 1204. The ESG aggregator 1200 may further receive an operator identifier and associated service guide information from a second operator. This information may be received at the input 1201 and also included in the bootstrap ESG by the data aggregator 1204. In the example illustrated in FIG. 12, the data aggregator 1204 includes an information identifier 1202 for identifying service guide information received via input 1201 to be included in the bootstrap ESG. The service guide information may further be stored in a memory 1205 for inclusion in a bootstrap ESG. Alternatively, the service guide information may be transmitted to a bootstrap formulator 1207. The bootstrap formulator 1207 may receive stored service guide information from the memory 1205 or may receive service guide information from the information identifier 1202 in this example.

Any information corresponding to the respective ESG fragments may be included in the bootstrap ESG by the bootstrap formulator 1207 of the data aggregator 1204. For example, the bootstrap formulator 1207 of the data aggregator 1204 may include an IP address-port number corresponding to the source of the ESG data, purchasing information in a corresponding ESG (e.g., the data may indicate if a corre-

13

sponding program or service is free, available to registered users only, available for a fee, etc.), a URI of the ESG fragment, a service provider identifier if the service provider is different from the operator, a date or time of last update, a date or time of an expected next update, validity information, etc. Thus, data from multiple ESG fragments may be included in the bootstrap ESG by the bootstrap formulator **1207** of the data aggregator **1204**.

The ESG aggregator **1200** may further include an output **1203** for providing the bootstrap ESG to a user or receiver. The bootstrap ESG as described may include information from a plurality of ESG fragments. The information may further be provided in a hierarchical structure such that any ESG fragments, including ESG fragments referenced in the bootstrap ESG, may reference other ESG fragments. The output **1203** may thus provide a list of available ESG fragments in the bootstrap ESG from which a user may select a desired ESG fragment. For example, a desired ESG fragment may identify an operator, a service provider, a valid program or service, purchasing information, etc.

FIG. **13** is a flowchart illustrating an example of identifying a desired ESG fragment corresponding to a program or service. A bootstrap ESG may be identified, the bootstrap ESG containing information on a plurality of ESG fragments. In STEP **1301** of the example illustrated in FIG. **13**, an IP address and port number is determined corresponding to a bootstrap ESG. Based on the IP address and port number, the bootstrap ESG is identified (STEP **1302**). A user or subscriber at a mobile terminal may desire a particular program or service associated with a corresponding ESG fragment. The ESG fragment of the desired program or service may be included in the identified bootstrap ESG. The criteria are determined in STEP **1303** for identifying the desired ESG fragment. For example, a user or subscriber at a mobile terminal may desire a program from a specified operator or service provider, or a particular free program or purchasable program or service, a particular valid program or service in a range of valid dates or times, etc. The bootstrap ESG may be parsed (STEP **1304**) to determine an ESG fragment corresponding to the determined criteria from STEP **1303**. In STEP **1305**, a secondary ESG fragment (i.e., an ESG fragment referred to by the bootstrap ESG or another ESG) may be identified in the bootstrap ESG corresponding to the determined criteria. In STEP **1306**, the desired secondary ESG fragment is selected. Information pertaining to the secondary ESG fragment may, for example, be downloaded to the mobile terminal.

In addition, the secondary ESG fragments may further contain information on, or refer to, other ESG fragments. Also, the bootstrap ESG may contain information on, or refer to, an ESG fragment that is also referred to by another secondary ESG fragment.

Embodiments of the invention include any novel feature or combination of features disclosed herein either explicitly or any generalization thereof. While embodiments of the invention have been described with respect to specific examples including various illustrative modes of carrying out the invention, those skilled in the art will appreciate that there are numerous variations and permutations of the above described systems and techniques. Thus, the spirit and scope of the invention should be construed broadly as set forth in the appended claims.

The invention claimed is:

1. An apparatus comprising:

at least one processor; and
at least one memory including computer program code, the
at least one memory and the computer program code

14

configured to, with the at least one processor, cause the apparatus to perform at least the following,

determine to assemble service guide information in an electronic service guide fragment, wherein the assembled electronic service guide fragment includes a reference to another electronic service guide fragment in a hierarchical arrangement;

determine to manage the assembled electronic service guide fragment and provide information on the availability and scope of the electronic service guide fragment by way of a bootstrap electronic service guide; and
determine to transmit the assembled electronic service guide fragment to a terminal wherein the electronic service guide fragment is transmitted in a transport object, wherein the bootstrap electronic service guide comprises information from the electronic service guide fragment and a plurality of other electronic service guide fragments.

2. The apparatus of claim 1, wherein the bootstrap electronic service guide comprises information selected from at least one of provisioning data, administrative data, core data, and access data, and wherein the transport object is transported in a container, the container including a header and a payload.

3. The apparatus of claim 2, wherein the bootstrap electronic service guide comprises provisioning data selected from at least one of purchase item data, purchase data, and purchase channel data.

4. The apparatus of claim 2, wherein the bootstrap electronic service guide comprises core data selected from at least one of service data, schedule data, and content data.

5. The apparatus of claim 2, wherein the bootstrap electronic service guide comprises access data selected from at least one of access data and session description data.

6. The apparatus of claim 1, wherein the bootstrap electronic service guide comprises information from a first electronic service guide fragment and information from a second electronic service guide fragment.

7. The apparatus of claim 6, wherein the first electronic service guide fragment includes service guide information corresponding to a third electronic service guide fragment.

8. The apparatus of claim 7, wherein the third electronic service guide fragment further includes service guide information corresponding to a fourth electronic service guide fragment.

9. The apparatus of claim 7, wherein the second electronic service guide fragment further includes service guide information corresponding to the third electronic service guide fragment.

10. The apparatus of claim 1, wherein the bootstrap electronic service guide comprises information from a first electronic service guide fragment, information from a second electronic service guide fragment, and information from a third electronic service guide fragment, the first electronic service guide fragment further comprising service guide information referring to the third electronic service guide fragment.

11. The apparatus of claim 1, wherein the bootstrap electronic service guide comprises information from a first electronic service guide fragment and information from a second electronic service guide fragment, the first electronic service guide fragment comprising provisioning data of a corresponding program or service and the second electronic service guide fragment comprising non-provisioning data corresponding to the program or service.

15

12. The apparatus of claim 11, wherein the provisioning data is selected from at least one of purchase item, purchase data, and purchase channel information.

13. The apparatus of claim 11, wherein the non-provisioning data is selected from at least one of service, schedule, content, access, and session description information.

14. The apparatus of claim 11, wherein the first electronic service guide fragment and the second electronic service guide fragment are received from different operators.

15. The apparatus of claim 11, wherein the first electronic service guide fragment and the second electronic service guide fragment are received from different service providers.

16. The apparatus of claim 15, wherein the first electronic service guide fragment and the second electronic service guide fragment pertain to a program or service.

17. The apparatus of claim 16, wherein the first electronic service guide fragment contains basic information about the program or service and the second electronic service guide fragment contains more detailed information about the program or service.

18. The apparatus of claim 17, wherein the basic information includes at least one of a name or identifier of the program or service.

19. The apparatus of claim 18, wherein the more detailed information includes at least one of a biography of one or more actors, one or more interviews, interactive services, and provisioning information pertaining to the program or service.

20. A method comprising processing at least one of (1) data, (2) information, and (3) at least one signal, the at least one of (1) data, (2) information, and (3) at least one signal based, at least in part, on the following:

at least one determination to identify, at an apparatus, an electronic service guide fragment as an electronic service guide, wherein the electronic service guide comprises data corresponding to a plurality of secondary electronic service guide fragments;

at least one determination to parse the electronic service guide for identifying a secondary electronic service guide fragment in the plurality of secondary electronic service guide fragments, wherein the determination to parse the electronic service guide comprises:

determining to identify a criterion in the electronic service guide, wherein the criterion includes a service provider identifier, an operator identifier, or a combination thereof; and

determining to identify a secondary electronic service guide fragment corresponding to the identified criterion;

at least one determination to select the secondary electronic service guide fragment based on the parsing step, wherein the electronic service guide comprises information of the plurality of secondary electronic service guide fragments in a hierarchical arrangement; and

at least one determination to manage the electronic service guide fragments and provide information on the availability and scope of the electronic service guide fragments by way of a bootstrap electronic service guide, wherein the electronic service guide fragment is transmitted to a terminal in a transport object.

21. The method of claim 20, wherein the at least one determination to identify an electronic service guide fragment comprises:

determining an internet protocol address corresponding to the electronic service guide fragment;

determining a port number corresponding to the electronic service guide fragment; and

16

determining to identify the electronic service guide fragment based on the internet protocol address and the port number.

22. The method of claim 20, wherein the information of the plurality of secondary electronic service guide fragments includes information selected from at least one of provisioning data, administrative data, core data, and access data, and wherein the transport object is transported in a container, the container including a header and a payload.

23. The method of claim 20, wherein the at least one determination to parse the electronic service guide further comprises determining to identify another criterion, the other criterion including an operator description, internet protocol address-port number, purchasing status, purchasing channel, uniform resource identifier of a secondary electronic service guide fragment, last update date or time, next expected update date or time, or validity of secondary electronic service guide fragment, and wherein the identifying of the secondary electronic service guide fragment is further based on the other criterion.

24. The method of claim 20, wherein the at least one determination to select the secondary electronic service guide fragment comprises determining to select the identified secondary electronic service guide fragment.

25. The method of claim 20, wherein the plurality of secondary electronic service guide fragments comprises a first electronic service guide fragment and a second electronic service guide fragment.

26. The method of claim 25, wherein the first electronic service guide fragment includes service guide information corresponding to the second electronic service guide fragment.

27. The method of claim 25, wherein the first electronic service guide fragment further comprises service guide information corresponding to a third electronic service guide fragment.

28. The method of claim 27, wherein the second electronic service guide fragment further comprises service guide information corresponding to the third electronic service guide fragment.

29. The method of claim 20, wherein the plurality of secondary electronic service guide fragments comprises a first electronic service guide fragment and a second electronic service guide fragment, the first electronic service guide fragment including provisioning data of a corresponding program or service and the second electronic service guide fragment including non-provisioning data corresponding to the program or service.

30. A non-transitory computer-readable storage medium carrying one or more sequences of one or more instructions which, when executed by one or more processors, cause an apparatus to at least perform the following steps:

determining to identify an electronic service guide fragment as an electronic service guide, wherein the electronic service guide fragment comprises data corresponding to a plurality of secondary electronic service guide fragments;

determining to parse the electronic service guide for identifying a secondary electronic service guide fragment in the plurality of secondary electronic service guide fragments, wherein the determination to parse the electronic service guide comprises:

determining to identify a criterion in the electronic service guide, wherein the criterion includes a service provider identifier, an operator identifier, or combination thereof; and

17

determining to identify a secondary electronic service guide fragment corresponding to the identified criterion;

determining to select the secondary electronic service guide fragment based on the parsing step, wherein the electronic service guide comprises information of the plurality of secondary electronic service guide fragments in a hierarchical arrangement; and

determining to manage the electronic service guide fragments and provide information on the availability and scope of the electronic service guide fragments by way of a bootstrap electronic service guide, wherein the electronic service guide fragment is transmitted to a terminal in a transport object.

31. The non-transitory computer-readable storage medium of claim 30, wherein the determination to identify an electronic service guide fragment comprises:

determining an internet protocol address corresponding to the electronic service guide fragment;

determining a port number corresponding to the electronic service guide fragment; and

determining to identify the electronic service guide fragment based on the internet protocol address and the port number.

32. The non-transitory computer-readable storage medium of claim 30, wherein the information of the plurality of secondary electronic service guide fragments includes information selected from at least one of provisioning data, administrative data, core data, and access data, and wherein the transport object is transported in a container, the container including a header and a payload.

33. The non-transitory computer-readable storage medium of claim 30, wherein the determination to parse the electronic service guide further comprises determining to identify another criterion, the other criterion including an operator description, internet protocol address-port number, purchasing status, purchasing channel, uniform resource identifier of a secondary electronic service guide fragment, last update date or time, next expected update date or time, or validity of secondary electronic service guide fragment, and wherein the identifying of the secondary electronic service guide fragment is further based on the other criterion.

34. The non-transitory computer-readable storage medium of claim 30, wherein the determination to select the secondary electronic service guide fragment comprises determining to select the identified secondary electronic service guide fragment.

35. The non-transitory computer-readable storage medium of claim 30, wherein the plurality of secondary electronic service guide fragments comprises a first electronic service guide fragment and a second electronic service guide fragment.

36. The non-transitory computer-readable storage medium of claim 35, wherein the first electronic service guide fragment includes service guide information corresponding to the second electronic service guide fragment.

37. The non-transitory computer-readable storage medium of claim 35, wherein the first electronic service guide fragment further comprises service guide information corresponding to a third electronic service guide fragment.

38. The non-transitory computer-readable storage medium of claim 37, wherein the second electronic service guide fragment further comprises service guide information corresponding to the third electronic service guide fragment.

39. The non-transitory computer-readable storage medium of claim 30, wherein the plurality of secondary electronic service guide fragments comprises a first electronic service

18

guide fragment and a second electronic service guide fragment, the first electronic service guide fragment including provisioning data of a corresponding program or service and the second ESG fragment including non-provisioning data corresponding to the program or service.

40. An apparatus comprising:

means for determining to identify an electronic service guide fragment as an electronic service guide, wherein the electronic service guide fragment comprises data corresponding to a plurality of secondary electronic service guide fragments;

means for determining to parse the electronic service guide for identifying a secondary electronic service guide fragment in the plurality of secondary electronic service guide fragments wherein the determination to parse the electronic service guide comprises:

determining to identify a criterion in the electronic service guide, wherein the criterion includes a service provider identifier, an operator identifier, or a combination thereof; and

determining to identify a secondary electronic service guide fragment corresponding to the identified criterion;

means for determining to select the secondary electronic service guide fragment based on information from the means for parsing, wherein the electronic service guide comprises information of the plurality of secondary electronic service guide fragments in a hierarchical arrangement; and

means for determining to manage the electronic service guide fragments and provide information on the availability and scope of the electronic service guide fragments by way of a bootstrap electronic service guide, wherein the electronic service guide fragment is transmitted to a terminal in a transport object.

41. The apparatus of claim 10, wherein the means for determining to identify an electronic service guide fragment comprises:

means for determining an internet protocol address corresponding to the electronic service guide fragment;

means for determining a port number corresponding to the electronic service guide fragment; and

means for determining to identify the electronic service guide fragment based on the internet protocol address and the port number.

42. The apparatus of claim 10, wherein the information of the plurality of secondary electronic service guide fragments includes information selected from at least one of provisioning data, administrative data, core data, and access data, and wherein the transport object is transported in a container, the container including a header and a payload.

43. The apparatus of claim 10, wherein the determination to parse the electronic service guide further comprises determining to identify another criterion, the other criterion including an operator description, internet protocol address-port number, purchasing status, purchasing channel, uniform resource identifier of a secondary electronic service guide fragment, last update date or time, next expected update date or time, or validity of secondary electronic service guide fragment, and wherein the identifying of the secondary electronic service guide fragment is further based on the other criterion.

44. An apparatus comprising:

at least one processor; and

at least one memory including computer program code,

19

the at least one memory and the computer program code configured to, with the at least one processor, cause the apparatus to perform at least the following:

determine to identify an electronic service guide fragment as an electronic service guide, wherein the electronic service guide fragment comprises data corresponding to a plurality of secondary electronic service guide fragments,

determine to parse the electronic service guide to identify a first secondary electronic service guide fragment and a second secondary electronic service guide fragment in the plurality of secondary electronic service guide fragments, wherein the determination to parse the electronic service guide comprises:

determining to identify a criterion in the electronic service guide, wherein the criterion includes a service provider identifier, an operator identifier, or a combination thereof; and

determining to identify a secondary electronic service guide fragment corresponding to the identified criterion, and

determine to select the first and second secondary electronic service guide fragments, wherein the first and second secondary electronic service guide fragments pertain to a program or service and have been provided

20

by different service providers, and a user interface configured to display information from the first and second secondary electronic service guide fragments; and determine to manage the electronic service guide fragments and provide information on the availability and scope of the electronic service guide fragments by way of a bootstrap electronic service guide, wherein the electronic service guide fragment is transmitted to a terminal in a transport object.

45. The apparatus of claim **44**, wherein the first secondary electronic service guide fragment contains basic information about the program or service and the second secondary electronic service guide fragment contains more detailed information about the program or service.

46. The apparatus of claim **45**, wherein the basic information includes at least one of a name or identifier of the program or service, and wherein the transport object is transported in a container, the container including a header and a payload.

47. The apparatus of claim **46**, wherein the more detailed information includes at least one of a biography of one or more actors, one or more interviews, interactive services, and provisioning information pertaining to the program or service.

* * * * *